Amendments to the Claims

This Listing of Claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently Amended): A method of improving a thermal stability for cobalt salicide, comprising:

providing a substrate having a silicon layer thereon;

forming a cobalt layer over the silicon layer;

forming a TiN_x layer over the cobalt layer;

performing a first thermal process to form a cobalt salicide layer over the silicon layer, the performing of the first thermal process including:

diffusing cobalt into the silicon layer to form the cobalt salicide layer;

diffusing nitrogen in the TiN_x layer into the cobalt salicide layer; and

minimizing a diffusion of the Ti from the TiNx layer into the silicon layer; and

removing a non-reactive cobalt layer,

wherein the TiN_x layer is formed by a sputtering process, and a ratio of N_2 to Ar in a gas used in the sputtering process is approximately 3:1 ~~includes x atoms of nitrogen for each atom of titanium in a TiNx molecule, and a value of x is greater than 0.9~~.

Claim 2 (Original): The method of claim 1, further comprising:

performing a second thermal process,

wherein the second thermal process is performed after the removing of the non-reactive cobalt layer.

Claims 3-5 (Canceled).

Claim 6 (Original): The method of claim 1, wherein the TiN_x layer is formed to a thickness in a range of approximately 25 angstroms to approximately 100 angstroms.

Claim 7 (Currently Amended): A method of forming cobalt salicide, comprising:

providing a layer of silicon; forming a layer of cobalt over the layer of silicon;

forming a layer of TiN_x over the layer of cobalt, wherein ~~a value of x is greater than 0.9~~ the TiN_x layer is formed by a sputtering process, a ratio of N_2 to Ar in a gas used in the sputtering process is approximately 3:1; and

performing a first thermal process to form a cobalt salicide layer over the silicon layer, the performing of the first thermal process including:

diffusing cobalt into the silicon layer to form the cobalt salicide layer ~~and~~;

diffusing nitrogen in the TiN_x layer into the cobalt salicide layer; and

minimizing a diffusion of the Ti from the TiN_x layer into the silicon layer.

Claim 8 (Original): The method of claim 7, further comprising:

removing a layer of non-reactive cobalt; and

performing a second thermal process, the second thermal process being performed to decrease a resistance of cobalt salicide formed in the performing of the first thermal process.

Claims 9-11 (Canceled).

Claim 12 (Original): The method of claim 1, wherein the TiN_x layer is formed to a thickness in a range of approximately 25 angstroms to approximately 100 angstroms.

Claim 13 (Currently Amended): A method for forming cobalt salicide having improved thermal stability, comprising:

providing a silicon layer, the silicon layer being one of a substrate formed of silicon and a layer of silicon formed over a substrate;

forming a cobalt layer over the silicon layer;

forming a TiNx layer over the cobalt layer, wherein ~~a value of x is greater than 0.9~~ the TiN_x layer is formed by a sputtering process, a ratio of N_2 to Ar in a gas used in the sputtering process is approximately 3:1;

performing a first thermal process to form a cobalt salicide layer over the silicon layer, the performing of the first thermal process including:

diffusing cobalt into the silicon layer to form the cobalt salicide layer;

diffusing nitrogen in the TiN_x layer into the cobalt salicide layer; and

minimizing a diffusion of the Ti from the TiN_x layer into the silicon layer;

removing any unreacted cobalt; and

performing a second thermal process to reduce a resistance of cobalt salicide formed in the performing of the first thermal process.

Claims 14-16 (Canceled).

Claim 17 (Original): The method of claim 13, wherein the TiN_x layer is formed over the cobalt layer to a thickness in a range of approximately 25 angstroms to approximately 100 angstroms.